Space Weather Forecast

Issued on Sunday, 12 November 2023 at 13:11 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: 09 Nov CME arrived at Earth early Day 1 (12 Nov), although weaker than anticipated. Chance of G1 Minor Storm day 1 (12 Nov) and possibly early day 2 (13 Nov).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity is at Moderate levels with a solitary Moderate class flare observed from a region in the far southwest of the disc. There are five sunspot regions on the disc, the largest located in the northwest, with moderate complexity. The remaining four regions, especially the three in the southwest are significantly smaller and remain magnetically simple at this time. A new sunspot has recently emerged south-centre disc, which appears stable at present. No Earth-directed CMEs have been observed in the past 24 hours.

Solar Wind / Geomagnetic Activity: Solar winds overall are felt to be reflective of the waning enhancement from a fast wind regime stemming from a 'coronal hole'. Solar winds fell from elevated to slightly elevated levels during the first half of the period. However, a CME (coronal mass ejection) which left the Sun on 09 Nov, arrived at Earth at 12/0530UTC, later than anticipated. Solar winds increased to peak near strong levels briefly early on 12 Nov, before gradually declining to the current elevated levels.

The associated magnetic field was steady at first, becoming weak to moderate with the arrival of the CME. The all important north-south component was also steady at the start of the period, becoming weakly southward orientated, following the aforementioned CME arrival. The net result of the above solar wind measures was for mostly Quiet (Kp 0-2) geomagnetic conditions, with an Unsettled to Active interval observed 12/0600-0900UTC due to weak CME influences.

Energetic Particles / Solar Radiation: Solar radiation levels remained at background levels.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate, with a chance of further isolated Moderate-class flares on days 1 and 2 (12 and 13 Nov), reducing to a slight chance on days 3 and 4 (14 and 15 Nov).

Solar Wind / Geomagnetic Activity: Solar winds are currently at slightly elevated levels due to the arrival of a CME. Geomagnetic conditions have been mostly Quiet to Active so far, although there is a Chance of a G1/Minor Storm, given any prolonged southward component of the magnetic field. Geomagnetic conditions becoming mostly Quiet days 2 and 3 (13-14 Nov), before a possible glancing blow from a CME (which left the Sun on 10 Nov), arrives during day 4 (15 Nov), which may increase geomagnetic conditions to Unsettled or Active, with slight chance of G1/Minor Storm.

Energetic Particles / Solar Radiation: There is a daily very slight chance of S1 or greater radiation storm conditions should any of the western solar hemisphere sunspot groups produce

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significant flares in the period. This risk should begin to wane from the start of the next working week as these sunspots progress onto the far side.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	60	20	1	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	25	25	20	15
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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